

## BASIC - Beginners' All-purpose Symbolic Instruction Code

To connect your teletype to the Time-sharing system, press the ORIG key. If you hear a tone (speaker should be turned up), and then no tone, you are ready to enter the Hello sequence. In the Hello sequence shown below, lower-case letters are used to indicate systems output and upper-case for user's input. Incidentally, to disconnect your teletype from the Time-sharing system, press the CLR key.

HELLO @

User number -- S100000 (must be 6 digits or 1 letter and 5 digits) @

System -- BASIC @

New or old -- NEW (unless problem has been saved) @

New problem name -- EXAMPL (any 1 to 6 characters) @

```
All state- (10      PRINT 'X', 'SINE X' @
ments re-  (20      READ X @
quire a    (30      LET F1 = X @
numeric    (40      LET F2 = 1 @
label no   (50      FOR F = 3 to 19 STEP 2 @
more than  (60      LET F2 = F*(F-1) * (-F2) @
5 digits & (70      LET F1 = F1 + (X ↑ F, F2) @
no spaces  (80      NEXT F @
           (90      PRINT X, F1 @
           (100     GO TO 20 @
           (110     DATA 1.5707, 1.0471, .7854, .6283 @
           (99999   END @
```

Without	(LIST @	(--XXXXXX to list your program beginning at statement No. XXXXXX)
statement	(RUN @	(if you want your program to run)
labels	(STOP	(if you want printing to stop)
	(SAVE @	(if you want your program saved for later use)
	(UNSAVE @	(if you want to destroy a previously saved program)
	(CATALOG @	(if you want the names of programs saved for a user number)
	(NEW @	(to erase current program and to start a new program)
	(OLD @	(if in the Hello sequence, would search for saved programs)
	(SCRATCH @	(erases a current program but retains the name)
	(RENAME @	(if you want to rename a program)

Return Key @ - Will not print on hard copy

← Key - Erase one character for each back error (spaces are considered characters)

Alt. Mode Key - If pressed will erase an entire line.

Variables are single letters possibly followed by a single digit. A number may be up to nine digits.

A line of print may contain five zones of fifteen spaces each. Variables printed will be no more than six significant spaces each, except for integers. Any trailing zeros after the decimal point are not printed. For numbers less than 0.1, the form X.XXXXXX E - Y is used unless the entire number can be printed as a six decimal number; i.e., .03456 is exact; 3.45600 E - Z has been rounded. If the number is an exact integer, the decimal point is not printed. Integers of up through 9 digits are printed in full.

Hierarchy of Arithmetic Operators: 1) The expression inside a parenthesis pair is computed before the parenthesized quantity is used in further computations; 2) Raising to a power is computed before multiply and or divide which in turn are computed before addition and or subtraction, in the absence of parenthesis; 3) Several arithmetic operators of the same order are computed from left to right.

## Correction to a Program - (For explanation of error messages see Pages 53 & 54 of BASIC MANUAL)

Changing a line -- Type it correctly with the same line number.

Inserting a line -- Type it with a line number between those of the two existing. BASIC sorts your program statements for you.

Deleting a line -- Type the line number only, followed by the "Return Key".

Summary of the 15 BASIC Statements - In this summary it is assumed that all statements begin with a line number. Following each is one example.

LET	LET <variable> = <expression> . i. e., 10 LET X1 = Y + Z _ (Z / A - B ↑ D1)
READ	READ <variable> . <variable> . . . . (variable) i. e., 10 READ X Y, A1 Q(I, J)
DATA	DATA <number> . <number> . . . <number> i. e., 1, 2, -3, 7, 123 479, -2 35-4
PRINT	PRINT <label> . or <label> <expression> . or <expression> 10 PRINT "SINE", "X(I, K), A + B * COS(Y)
GOTO	GOTO <line number> i. e., 10 GOTO 17
IF-THEN	IF <expression> <relational> <expression> THEN <line number> i. e., 10 IF X + Y 0 THEN 419
FOR	FOR <unsubscripted variable> = <expression> TO <expression> STEP <expression> 10 FOR I = 1 TO 17 10 FOR X1 = 0 TO 7 STEP 0.5
NEXT	NEXT <unsubscripted variable> i. e., 10 NEXT X1
END	END i. e., 10 END
STOP	STOP i. e., 10 STOP
DEF	DEF FN <letter> ( <unsubscripted variable> ) = <expression> 10 DEF FNG(Z) = 1 + SQR(1 + Z * Z)
GOSUB	GOSUB <line number> i. e., 10 GOSUB 110
RETURN	RETURN i. e., RETURN
DIM	DIM <letter> ( <integer> ) or <letter> ( <integer> , <integer> ) 10 DIM A(17), B(3, 20)
REM	REM <any string of characters whatsoever> 10 REM THIS IS THE END OF APPENDIX C

BASIC has available to the user the following functions:

<u>FUNCTIONS</u>	<u>PURPOSE</u>
SIN (X)	Sine of X
COS (X)	Cosine of X
TAN (X)	Tangent of X
ATN (X)	Arctangent of X
EXP (X)	Natural exponential of X, $e^X$
ABS (X)	Absolute value of X, $ X $
LOG (X)	Natural logarithm of $ X $
SQR (X)	Square root of $ X $
RND (X)	
INT (X)	

X must be in radians